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A Prospective Study to Analyse the Functional and Radiological Outcome of Intertrochanteric Femur Fractures Treated with Cemented Bipolar Hemiarthroplasty

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ABSTRACT

Fractures of proximal femur in older patients have a significant influence on health care system as well as on society as a whole and these fractures can be caused by moderate or minor trauma. Internally fixed unstable trochanteric fractures might be difficult to retain in position during healing. With regard to treating these fractures, problems such as implant failure, collapse and cut through of the lag screw cause considerable functional impairment and discomfort. The primary bipolar hemiarthroplasty used to treat these patients reduces the post-operative problems brought on by extended immobilisation or implant failure and helps the patients quickly resume their normal pre-injury activity level. 30 patients in the age group of 50-80 years of either sex who are diagnosed with Intertrochanteric femur fractures and patients giving informed consent for study were included in the study. The inclusion criteria were patients >50 years of age, intertrochanteric fracture (Type I and type II as per Evans classification). Patients with polytrauma and medically unfit patients were excluded from the study. In our study were females with mean age of 64.3333 and the remaining 12(40%) were males with mean age of 66.75. The most common cause of trauma seen in 60% of patients was RTA followed by trivial fall in 40%. Final results were calculated using the Harris Hip score with 96.7% cases as excellent and 3.3% had good results respectively. Follow-up was done at 1, 3 and 6 months. Cemented bipolar hemiarthroplasty in intertrochanteric fractures has an advantage of stable adequate fixation with early return to activities of daily living, thus preventing serious life threatening complications.

INTRODUCTION

Fractures of proximal femur in older patients have a significant influence on health care system as well as on society as a whole and these fractures can be caused by moderate or minor trauma. Aging is accompanied with an increased fracture hip risk related to osteoporosis and atrophy in muscular mass around the hips, which causes hip fractures more prevalent in elderly among the population. The development of internal fixation has been beneficial for treating trochanteric hip fractures in older people. Cemented fixation is advantageous for enhancing the initial fixation strength in aged patients with poor bone quality[1]. However, due to severe osteoporosis and loss of fixation associated with calcar defects, which need conversion to hip arthroplasty, internal fixation has been contested[2].

Internally fixed unstable trochanteric fractures might be difficult to retain in position during healing[3]. With regard to treating these fractures, problems such as implant failure, collapse and cut through of the lag screw cause considerable functional impairment and discomfort. The primary bipolar hemiarthroplasty used to treat these patients reduces the post-operative problems brought on by extended immobilisation or implant failure and helps the patients quickly resume their normal pre-injury activity level. The goal of the surgery is to achieve relief of pain with early mobilization and weight bearing of the patient[4]. The purpose of the present study was to assess the clinical and radiological outcomes of inter trochanteric femur fractures treated by bipolar cemented hemiarthroplasty.

In order to reduce postoperative sequelae such pressure sores, pneumonia, atelectasis and pseudo arthrosis, primary hemiarthroplasty offers a therapy strategy that helps these patients receive proper fixation and early mobilization[5].

Aims and Objectives: The aim of this study is to assess the clinical and radiological outcomes of inter trochanteric femur fractures treated by bipolar cemented hemiarthroplasty at Narayana Medical College, Nellore between June 2022-May 2024.

MATERIALS AND METHODS

The research was done in department of orthopaedic, Narayana Medical College and Hospital, Nellore from June 2022-May 2024 after getting ethical committee clearance. A total number of 30 patients in the age group of 50-80 years of either sex who are diagnosed with Intertrochanteric femur fractures and patients giving informed consent for study were included in the study. The Narayana Medical College and Hospital in Nellore served as the study's location. Total of thirty individuals with intertrochanteric fractures studied from June 2022-May 2024.

These patients will be researched and followed-up on for at least six months. A follow-up will be done at the first, third and sixth months. Harris hip score evaluations will be performed on each follow-up result. Prior to include any patients in the study, informed consent will be acquired from each one of them and patient privacy and confidentiality will be upheld.

Inclusion Criteria:

- Age between 50-80 years were selected.
- Patients with Intertrochanteric fractures (Boyd and Griffin Type I to II).

Exclusion Criteria:

- Age <50 years.
- Patients with Intertrochanteric fracture (Boyd and Griffin Type III TO IV).
- Patients with pathological fractures.
- Patients with Polytrauma.

Pre-Operative Evaluation:

- At admission, a patient's overall health is evaluated and any co-morbidities are recorded.
- Patients who were late in achieving anaesthetic fitness were treated with skeletal traction.
- Anteroposterior and lateral x-rays were obtained and analysed for this radiographic assessment.

Follow up:

- The Harris hip score has been utilized to evaluate functional outcome during follow-up.

Harris Hip Score:

- Excellent >or equal to 90 points
- **Good:** 80-89 Points.
- **Fair:** 70-79 Points.
- **Poor:** <70 Points.

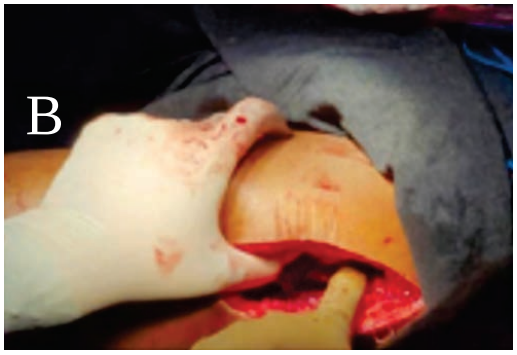
Surgical Procedure: By Harding's lateral approach, a longitudinal skin incision was made over the lateral aspect, the incision was deep-end subcutaneously, tensor fascia lata was incised, vastus lateralis was split, fracture site was visualised and the soft tissues were cleared head is removed by cork screw along with the remaining fractur fragments. The greater trochanter, abductor mechanism and all of fractured bone fragments were all carefully preserved. The femoral medullary canal is reamed after measuring the proper head size. So that the joint could be stable, trial reduction has been done to figure out the length, offset, as well as version of the neck.

The medullary canal is thoroughly washed before it is filled with cement. With or without a graft, the stem was gently tapped into the medullary canal until the contact of the implant and bone was good. Small pieces of calcar bone that had been cut down were placed over the middle of the femoral stem and held in

place with cerclage wires if needed. With the abductor mechanism, the broken greater trochanter was held in place with a tension band wiring method. A good wash was done, the drain was left in place, the bleeding was stopped, the wound was sutured in layers and a sterile dressing was kept.

Post Operative Protocol: All of the patients got routine intravenous antibiotic prophylaxis during surgery. This was executed for 5 days before shifting to oral antibiotics until the sutures could be taken out. Drain was taken out after 48 hours. On the second day after surgery, a physiotherapist helped the people in group A walk with some weight on their legs. Depending on the strength of the bone fixation, they subsequently advanced to partial and finally full weight bearing. The sutures were removed on day 11 or day 12. Follow up was done after their first, third and sixth months. Each follow-up visit included a clinical evaluation of the patient using the Harris hip score.

FIG. 1: Intra Operative Pictures of Hemi Arthroplasty:



RESULTS AND DISCUSSIONS

Most of the patients i.e., 18 (60%) in our study were females with mean age of 64.3333 and the remaining 12(40%) were males with man age of 66.75. Most of the study participants 19(63.3%) belongs to A1.2 classification and the remaining 11(36.7) belongs to A1.1. Most of the study participants 16(53.3%) belongs to 1 of Boyd Griffin classification and the remaining 14(46.7) belongs to class 2. The most common side involved was right 17 (56.7%) and left side involvement was seen in 13(43.3%) of patients Singh index score of 2 was seen in 20 (66.7%) of population and the singh index score 3 was seen in 10 (33.3). The mean Singh index of the study participants was 2.333(0.479). The most common cause of trauma seen in 60% of patients was RTA followed by trivial fall in 40%.

Table 1: Harris hip score

Harris hip score	Minimum	Maximum	Mean	Std. dev	p-value
Baseline	69.00	90.00	79.7	6.21	0.000*
1 month	69.00	76.00	71.5333	1.77596	
3 months	79.00	97.00	87.1667	5.04520	
6 months	89.00	99.00	95.7333	2.51798	

Friedman test p<0.05* significant

The mean harris hip score at baseline, 1 month, 3 months and 6 months among the study participants were 79.7, 71.53,87.2 and 95.7 respectively and the difference was statistically significant with p=0.000*

Table 2: Harris hip scores at various interval

Harris hip score	Baseline	1 month	3 months	6 months	p-value
Poor	2(6.7)	1(3.3)	0(0)	0(0)	0.000*
Fair	14(46.7)	29(96.7)	2(6.7)	0(0)	
Good	13(43.3)	0(0)	19(63.3)	1(3.3)	
Excellent	1(3.3)	0(0)	9(30)	29(96.7)	

Fisher exact test p<0.05* significant

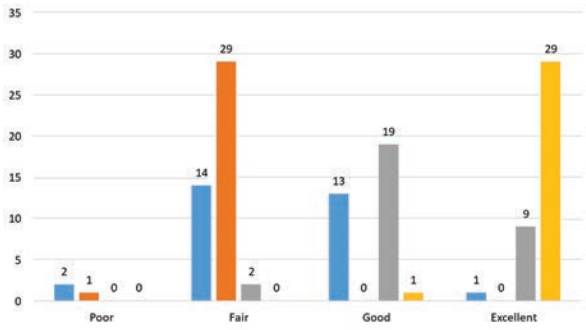


Fig. 2: Harris Hip Score at various Intervals

Fisher exact test was done to compare the categorical (distribution) of Harris hip excellent Harris hip score was seen in 96.7% patients by the end of 6 months and statistically significant difference was seen at all the follow ups.

Table 3: Mean operative time

Operative time	Minimum	Maximum	Mean	Std. dev
	80.00	120.00	100.00	16.34

The mean operative time was 100.00(16.34)

Table 4: Complications

Complications	Frequency	Percent
NILL	24	80.0
Infection	2	6.7
Lengthening	1	3.3
Pressure sore	1	3.3
Shortening	1	3.3
UTI	1	3.3

Most of the patients has no complications after the treatment only 6.7% of patients had infection and one patient had lengthening, one patient had pressure sore, one patient had shortening and one patient had UTI.

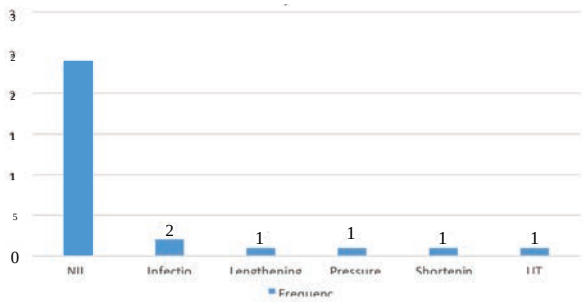


Fig. 3: Complications

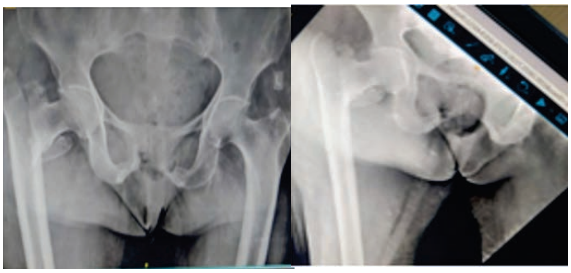
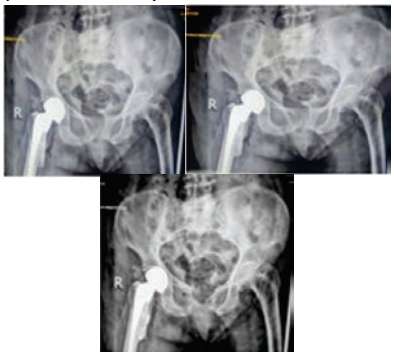


Fig. 5: PRE-Operative X-Rays

Post Operative X-Rays



1 Month 3Month 6Month

Intertrochanteric fractures in older people are linked to a lot of illness and death. Surgical intervention in these patients reduced the risk of death from these fractures by 20%. However, the failure rate is 56% and in comminution, osteoporosis, improper screw fixation early mobilization is not recommended. Their lack in strength and osteoporosis bones of the patients don't give the screws a good place to hold on, which leads to biomechanical failure early on. Because of this, the head of the femur falls and moves into varus and retroversion. This makes people walk with a limp because the abductor muscular lever arm gets shorter and weaker. Cutting the screw out of the femoral head is another reason why these people can't do their jobs and are in pain. Even though the rate of death is lower with internal fixation, the rate of complications is still between 4 and 50 %.

When these patients get a primary hemiarthroplasty, they get good fixation and can move around quickly. This reduces pain as well as improves function. It also stops complications. In a study by Harwin[6], bipolar prosthesis was put in 58 older patients with osteoporosis and intertrochanteric fractures which are comminuted. patients were followed for a period of 28 moths. In their study, the mean lifespan of the people who took part was 78 years. There was no loosening of the stem, dislocation of the stem, or deep infection. 91% of patients were able to walk before they were sent home. In a study by Broos[7] 94 elderly patients had bipolar vandeputte prostheses put in. The bipolar hemiarthroplasty group did better in terms of the average length of the surgery, the number of deaths, and how well it worked.

In a study by Rodop[8] 54 elderly people had bipolar leinbach hemiprosthesis put in. There weren't any cases of stems coming loose or coming out of place. Eighty percent of patients whose hips were scored by the Harris hip score had good to excellent results. The mean Harris hip score at the two-year follow-up was 83.10±10.90. A total of 25 patients were graded as excellent, 60 patients as good, 30 as fair and 5 as poor. It was observed that, patients with stable variety of intertrochanteric fractures had better outcome than the unstable variety in our study[9].

Early mobilization was good, that 93.3% of patients started partial weight-bearing on the 1st postoperative day. At the final follow up (mean 13.66±5.9 months), the general and mechanical complications were few., 1-year mortality rate was 16.7%., the mean Harris Hip score was 91.14±5.7[10]. Our study had no failures due to insufficient stem length or mechanical loosening. A significant difference in limb lengths can be clinically identified as a dislocation risk. To avoid dislocation, some writers propose preserving and closing the capsule, as well as reinsertion of the pelvitrochanteric muscles onto the vastus lateralis. Others have advocated for comprehensive postoperative bracing and extensive muscle rehabilitation. We do not commonly use bed rest, balanced suspension, or hip spica because the postoperative dislocations in our dataset had no effect on long-term functional outcomes.

We allow early mobilization with immediate full weight bearing, as in our opinion this is the major benefit and goal of the procedure. However, in our study there were no post operative dislocations. One patient in the early post-operative phase was tightly reduced and immobilized in a derotation boot for three weeks, following which the patient had a stable hip. The other patient suffered a fall after one month with dislocation and greater trochanter fracture, for which open reduction and trochanteric reattachment were performed. The dislocation rates are favorable compared to another research (Stern *et al* and Goldstein *et al* -10%, Saragaglia *et al* -14%). There were no deep infections, save for one patient who had a superficial infection that was treated with medication. Direct comparison of mortality rates is not feasible because of difficulty in matching critical factors such as age, gender, preinjury health status, social dependency and fracture type. In our study 1 patients (3.3%) had shortening of about 1cm post operatively. One patient with grade-I osteoporosis suffered a fall postoperatively after two months and developed Johansson's Type I periprosthetic fracture, which was addressed with open reduction and internal fixation with Broad Dynamic Compression plating. In comparison to earlier published findings on internal fixation and endoprosthetic substitution for intertrochanteric fractures, this series had no further notable medical (or) surgical complications.

CONCLUSION

The conclusion drawn in the text suggests that cemented hemiarthroplasty is recommended as a treatment for intertrochanteric fractures in elderly patients. Several advantages are highlighted Early Full Weight Bearing and Rapid Rehabilitation: Patients can bear weight early, which aids in rapid recovery and reduces complications associated with prolonged inactivity. Our study in favor of cemented hemiarthroplasty over other modalities like conservative management or various types of nails (e.g., Jewett nail, Ender's nail, Harris condylocephalic nail, Gamma nail) and DHS (Dynamic Hip Screw) for managing intertrochanteric fractures in osteoporotic elderly patients.

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